

REMARKS/ARGUMENTS

Applicant responds herein to the Office Action dated April 4, 2006.

Claims 1, 3, 7-10, 19 and 21 stand rejected on grounds of anticipation by Miyazaki (6,832,616). Further, claims 1, 3-7, 19 and 21 are stated to be anticipated by Taniyama (6,247,479). Lastly, claim 20 is stated to be obvious over Miyazaki or Taniyama, in further view of Matsuyama (6,514,570). Reconsideration is requested in view of the following remarks.

It is noted that this application has been previously prosecuted and that prosecution has been continued by applicant's recent filing of an RCE request. This is a first Office Action in the continued prosecution, wherein the previously submitted claims have now been rejected on what is deemed to be "new grounds of rejection." It is, therefore, deemed not necessary to explicate again the overall subject matter of the claims. Accordingly, applicant directly addresses a key point of apparent misunderstanding between the applicant and the Examiner.

Thus, among the limitations of the independent claims in the application is the recitation that the inner gas discharge port "is arranged eccentrically to a center of said surface of said substrate . . .". (Emphasis added).

In paragraph 3 of the Office Action, it is stated that the blocking members of the prior art further comprises an inner and outer discharge port "that are concentric/coaxially (sic) and thus anticipates the recitations of claim 1 of the present invention." (Emphasis added).

It is elementary that a concentric or coaxial arrangement is physically different from one wherein two elements are arranged eccentrically relative to one another. Thus, the "anticipation" based rejections in paragraph 3 and in paragraph 4 of the Office Action cannot be maintained.

In fact, the arrangement of the present invention is drastically different from that of the cited prior art and these differences go to the heart of the invention and to the different functionality of the present invention, as compared to the prior art.

Independent claim 1 of the present application, as amended, recites: "an atmosphere blocking member arranged oppositely and proximately to a substrate is formed with a processing solution discharge port and an inner gas discharge port discharging a processing solution and gas, respectively, and an outer gas discharge port is formed so as to annularly enclose the inner gas discharge port arranged eccentrically to a center of the substrate."

Since centrifugal forces caused by rotation have a minimal effect on a central portion of a substrate, it is difficult to dry droplets remaining on the central portion only by rotating the substrate. Arranging the inner gas discharge port toward the central portion of the substrate will allow gas to flow onto the central portion of the substrate from directly above. Then, horizontal forces (generated both by centrifugal force and wind power) hardly act on the droplets remaining on the central portion, so that the remaining droplets can be expelled effectively. Arranging the inner gas discharge port eccentrically to the center of the substrate, as recited in the instant claims, allows gas to flow horizontally to the droplets remaining on the central portion of the substrate, so that the remaining droplets can be expelled effectively. The invention of the present application further recites forming the outer gas discharge port so as to annularly enclose such eccentrically-arranged inner gas discharge port.

Independent claim 19 of the present application, as amended, recites: “the processing solution discharge port and the inner gas discharge port are arranged on an inner shaft of a support cylinder supporting the atmosphere blocking member; the inner gas discharge port is arranged eccentrically to a center of a substrate; and the outer gas discharge port is formed to be interposed between the inner shaft and the support cylinder.” Inserting the inner shaft into a hollow portion of the support cylinder produces an annular gap between the outer peripheral surface of the inner shaft and the inner peripheral surface of the support cylinder. In other words, independent claims 1 and 19 both recite “forming the outer gas discharge port so as to annularly enclose the inner gas discharge port arranged eccentrically to the center of the substrate.”

Independent claim 20 of the present application, as amended, recites: “an atmosphere blocking member arranged oppositely and proximately to a substrate is formed with a processing solution discharge port and an inner gas discharge port discharging a processing solution and gas, respectively, and an outer gas discharge port is formed inclined so as to annularly enclose the inner gas discharge port for discharging gas downwardly and outwardly.” According to the invention defined in claim 20, droplets expelled from the central portion of the substrate may be effectively removed from the peripheral portion of the substrate at a lower gas flow rate.

In contrast, Miyazaki (6,832,616) discloses an apparatus in which an inner tube nozzle 104 (204, 304) and an outer tube nozzle 103 (203, 303) are arranged “concentric/coaxially,” and the inner tube nozzle 104 (204, 304) is arranged oppositely to a center of a semiconductor wafer

100 (200, 300). In other words, the inner tube nozzle 104 (204, 304) of Miyazaki is absolutely different from “an inner gas discharge port arranged eccentrically to a center of a substrate.”

With the structure disclosed in Miyazaki, it is difficult to expel droplets remaining on the central portion of a substrate.

Turning now to Taniyama et al. (6, 247,479), this reference discloses a nozzle assembly 31 which assembles various types of nozzles, however, as apparent from Figs. 2 and 3, etc., this nozzle assembly 31 is far smaller than a planar size of a substrate, which is absolutely different from an atmosphere blocking member corresponding in planar shape and size to a substrate. Further, respective discharge ports disclosed in Taniyama et al. also significantly differ from “the inner gas discharge port arranged eccentrically to the center of a substrate and outer gas discharge port formed so as to annularly enclose the inner gas discharge port,” respectively.

Furthermore, both Miyazaki and Taniyama et al. fail to describe or suggest “an inner gas discharge port arranged eccentrically to the center of a substrate and an outer gas discharge port formed so as to annularly enclose the inner gas discharge port.” These references also fail to describe the idea of “forming the outer gas discharge port inclined for discharging gas downwardly and outwardly.”

Turning now to Matsuyama et al. (6,514,570), this reference teaches the idea of forming a supply nozzle 7 for supplying a developing solution. However, the supply nozzle 7 of Matsuyama et al. is not per se intended for discharging gas; nor is formed annularly. The invention recited in claim 20 of the present application recites forming the outer gas discharge port inclined on the atmosphere blocking member, which is different from forming the atmosphere blocking member itself inclined. In this manner, the supply nozzle 7 of Matsuyama et al. is absolutely different from the atmosphere blocking member defined in claim 20 of the present application. Accordingly, application of the technique of Matsuyama et al. to Miyazaki or Taniyama et al. would not have resulted in the structure as defined in claim 20 of the present application.

Accordingly, both Miyazaki and Taniyama et al. fail to describe “an inner gas discharge port arranged eccentrically to the center of a substrate” and “an outer gas discharge port formed so as to annularly enclose the inner gas discharge port” as defined in claims 1 and 19 of the present application. It is therefore requested that the rejections under 35 U.S.C. § 102(b) and (e)

be withdrawn. Further, Matsuyama et al. fails to teach an annular outer gas discharge port formed inclined for discharging gas downwardly and outwardly as defined in claim 20 of the present application. Accordingly, application of the technique of Matsuyama et al. to Miyazaki or Taniyama et al. would not have derived the structure as defined in claim 20 of the present application. Applicant therefore believes that the rejection under 35 U.S.C. § 103 is inappropriate.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims as amended and pass this case to issue.

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